

1983

A meta-analysis of the effectiveness of educational treatment programs for emotionally disturbed students

Claire Millhiser Rosenbaum

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**A META-ANALYSIS OF THE EFFECTIVENESS OF EDUCATIONAL
TREATMENT PROGRAMS FOR EMOTIONALLY DISTURBED STUDENTS**

The College of William and Mary in Virginia

Ed.D. 1983

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A Meta-analysis of the Effectiveness
Of Educational Treatment Programs
For Emotionally Disturbed Students

A Dissertation
Presented to
The Faculty of the School of Education
The College of William and Mary in Virginia

In Partial Fulfillment
Of the Requirements for the Degree
Doctor of Education

by
Claire Millhiser Rosenbaum
Spring 1983

A Meta-analysis of the Effectiveness of
Educational Treatment Programs
For Emotionally Disturbed Students

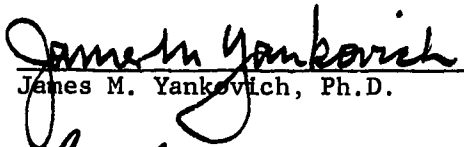
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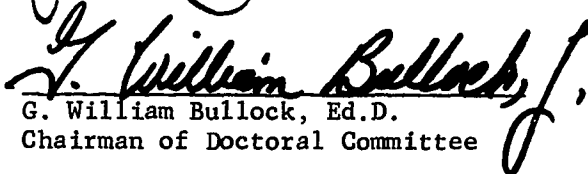
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Chairman of Doctoral Committee

Dedication

To my family, whose support, understanding and assistance have been unfailing for many years.

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**A Meta-analysis of the Effectiveness
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Chapter 1

Introduction

The teacher of the emotionally disturbed student is confronted with a confusing array of choices for classroom management. Techniques currently stressed in the literature, as well as in teacher training institutions, include the structured-behavioral approach, psychodynamic intervention, and academic treatment following established educational methods. The need exists, therefore, for a comparative study of the effectiveness of the various types of educational treatment programs for emotionally disturbed students.

Both positive and negative outcomes have been reported for many forms of treatment. For example, Simkins, Kingery, and Bradley (1970) published a description of the successful application of operant conditioning techniques to the modification of cluttered speech in an emotionally disturbed nine year old girl. In contrast, Solnick, Rincover, and Peterson (1977) reported an unsuccessful attempt to reduce the frequency of tantrums in a six year old girl through operant conditioning techniques. Faced with the reconciliation of dissimilar results from similar techniques, teachers have generally initiated a program of behavior modification while, according to survey responses, indicating a desire for knowledge of the effectiveness of alternate teaching modalities (Benson, 1977).

Estimates of the number of emotionally disturbed students in the school population vary, but it is generally accepted that the figure approaches 2 percent of the total population of school aged children (Rhodes and Tracy, 1972). With this proportion of the school population in need of special help, it is imperative that program planners and direct service providers be furnished with as much information as possible regarding the efficacy of management techniques, instructional methods, and treatment programs for these youngsters.

Statement of the Problem

It was the purpose of this study to identify and compare the effects of different educational treatment programs on emotionally disturbed children. This study sought to answer the following specific questions:

- (1) Are there significant differences in the total effect sizes of educational treatment programs for emotionally disturbed students?
- (2) Are there significant differences in the effect sizes of these treatment programs in the specific outcome measures of mathematics achievement, reading achievement, general achievement, or social skills?
- (3) Do the program elements, or student demographics, interact with the treatment programs significantly to affect the specific outcome measures of

mathematics achievement, reading achievement, social skills, or general achievement?

Theoretical Background

The background for this study was drawn from theory and research in educational programming for emotionally disturbed students. From this theoretical background and from selected research, the hypotheses were generated.

There have been numerous studies of the outcomes of educational programs for emotionally disturbed students. Imaginative play training and perceptual-motor interventions were found to yield positive changes in perception of body image as well as affective and social gains (Nahme-Huang, Singer, Singer and Wheaton, 1977). A reserved finding indicated that the application of a token reinforcement program in a public school may have been related to improvement in academic achievement as well as to enhanced attendance (O'Leary, Becker, Evans, and Sandargas, 1969).

Relative effectiveness of operant conditioning and play therapy in improving the communication and social functioning of psychotic children has been examined (Ney, Palvesky, and Markley, 1971). These researchers determined that improvement in mental age and in amounts of speech was greater after operant conditioning than after play therapy. Other researchers investigated attention and performance on simple tasks as well

as classroom attention of seriously disturbed children, and concluded that a significant number of autistic children improved in classroom attention under conditions of reduced auditory input (Fassler and Bryant, 1971).

In a long-range study, comparisons were made over a five-year period of Stanford Achievement Test scores for 40 children undergoing psychotherapy and 43 equally handicapped children who received no treatment. No overall differences were found between groups, when gains for the entire period were averaged out, but achievement was found to be affected by grade at the beginning of treatment. Children brought to the clinic by the third or fourth grade made greater and more consistent improvement than those whose treatment began in fifth or sixth grade (Ashcraft, 1971).

Investigators have analyzed public school classes for emotionally disturbed students. In a research analysis of public school classes for the emotionally handicapped, a series of tests of differences on group and group change variables between program types on 73 programs was conducted (Morse, Cutler and Fink, 1964). These investigators found evidence of meaningful relationships between types of interventions and changes which occurred in the students. Others reviewed research literature on children with behavior disorders, and found a need for the development of special methods for teaching

these handicapped students (Glavin and Quay, 1969).

Classroom achievement of aggressive students as well as some variable relationships have been analyzed (Feldhusen, Thurston, and Benning, 1970). In this presentation, a longitudinal analysis of the relationship of classroom behavior to academic achievement, these authors concluded that aggressive students and socially approved youngsters differed from one another in terms of academic achievement. They concluded further that there was little relationship or interaction between observed classroom behavior and the students' sex or grade level. In a study of therapeutic teaching techniques (Swift and Spivack, 1974), published reports of teaching methods for behaviorally troubled children were reviewed and methods found to be effective with a single student or with an entire class were described.

The reports cited above, plus others available in the literature, indicate that there are many accepted methods for educational treatment of emotionally disturbed students. Some experimental studies of these methods yield contradictory results; most of the research studies show positive gains in the students tested. Types of treatment programs examined have ranged from the use of individual tutoring (Bugental, 1977) to the use of an experimental resource room (Glavin, Quay, Annesley, Werry, 1971). Additional techniques have included a token

reinforcement system (Broden, 1970), the Buddy system (Fo, 1974), desensitization (Mueller, 1969), and relaxation training (Putre, 1977). With current national and local emphasis on providing appropriate public school education for all handicapped students, it is imperative to determine what effects these programs and their variables have in order to identify and implement the most effective program for educating emotionally disturbed students.

Definitions and Hypotheses

For the purposes of The present study, the following definitions will apply:

Meta-analysis

The statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating the findings.

Effect Size (ES)

A standard score computed by dividing the difference between the means of the experimental and control groups by the standard deviation (SD) of the control group.

Treatment Programs

These definitions apply to the eleven categories of treatment programs used in this study.

- (1) Psychoeducational - A treatment program focused on the child's behavior and his interpersonal relationships as well as his entire educational experience,

characterized by an educational team composed of special education teacher, psychologist, psychiatric consultant, social worker or other specialists.

- (2) Structured-behavioral (social) - A treatment program based on the identification of maladaptive behaviors which interfere with learning and subsequent assistance to the child in developing more adaptive behavior. Following established principals of behavior modification, emphasis is placed on elimination of maladaptive behaviors in areas such as fighting, in-seat behavior, or blurting out. Assessment is made of measurable progress.
- (3) Structured-behavioral (academic) - A treatment program, including the engineered classroom, identical to the above, where assessment is made of progress in academic areas such as spelling, reading, mathematics.
- (4) Sensori-neurological - A treatment program often used with children who demonstrate maladaptive behaviors such as perceptual-motor deficits, general coordination deficits, hyperactivity, impulsivity, short attention span or distractability. Such a program features reduced space and reduced environmental stimuli, structured school program, and a multisensory approach to learning tasks.

- (5) Psychopharmaceutical - A program of drug therapy prescribed by a physician to affect behavior. For this study, only journal articles concerned with mood altering drugs such as tranquilizers were included. Studies of the effects of stimulants or anticonvulsants were eliminated.
- (6) Academic - A classroom approach featuring an extension of traditional educational procedures where reading method A, for example, is compared with reading method B for its effectiveness.
- (7) Counseling (family, teachers) - The providing of counseling services by a psychologist or a psychiatrist on a regularly scheduled basis to those individuals most frequently in contact with the disturbed child. Change is measured in the students in both academic and social areas.
- (8) Counseling (group) - A program featuring regularly scheduled meetings of a class or part of a class with a therapist during the school day or as part of the school program.
- (9) Counseling (individual) - A program of intensive therapy sessions on a one to one basis between the student and the therapist, occurring during or after school hours. The therapist may or may not have input

into the educational program.

- (10) Cognitive training (academic) - A treatment for impulsive students. Training is done in areas of decision-making, problem solving, reflection, self-direction and self-control. Results are measured in academic areas.
- (11) Cognitive training (behavioral) - A method used with anxious, impulsive, phobic students. Training is done in the areas of relaxation, often with tapes and visual aids. The effect of this treatment is measured in the social skills area.

Hypotheses

The statements of hypotheses were formulated from previously discussed research on the effectiveness of educational treatment programs for emotionally disturbed students and the effects of demographic and programmatic variables on such programs. The hypotheses tested in this study are:

Hypothesis 1 - There are significant differences in the total effect sizes of the educational treatment programs for emotionally disturbed students.

Hypothesis 2 - There are significant differences in the effect sizes of the specific outcome measures of general achievement, reading achievement, mathematics achievement, and classroom behavior (social skills) for each of the

educational treatment programs.

Hypothesis 3 - Program elements and student demographics interact with the treatment programs to produce a significant effect upon the outcome measures of general achievement, reading achievement, mathematics achievement, and social skills scores of emotionally disturbed students.

Overview of the Study

A review of the relevant research which provided the theory and background for the present study is found in Chapter 2. In addition, Chapter 2 contains a review of the theoretical background of meta-analysis and of several studies employing meta-analysis as a statistical method. The methodology used to implement the study, descriptions of the data base, statistical analysis of the data is presented in Chapter 3. The results of the statistical analyses are presented in Chapter 4. Chapter 5 includes a discussion of the significant findings, presentation of the conclusions, and implications for future research.

Chapter 2

Review of the Literature

A review of previous research related to teaching methods for emotionally disturbed students, and the programmatic and demographic variables involved, is presented in Chapter 2. No study was found which dealt specifically with a comparison of several teaching methods; most studies consisted of reviews of methods available. Several studies were found which investigated the relationship of demographic and programmatic variables to achievement.

Chapter 2 is divided into two main sections. Included in the first section is a review of an analysis of program types, major reviews of interventions applied to emotionally disturbed students, and selected outcome studies of specific techniques. The first part also includes studies of the relationship of programmatic and demographic variables and achievement scores with emotionally disturbed students, and concludes with a summary of the literature reviewed.

In the second section meta-analysis is introduced as a technique for the statistical analysis of many studies. Previous integration methods are discussed. Meta-analysis theory, rationale, and computations are presented. The second section ends with a review of meta-analysis studies published as journal articles and as doctoral dissertations, and a summary of the section.

The chapter concludes with a chapter summary.

Analysis of Program Types

An analysis of the effect of special education classes for emotionally disturbed students was published in 1964 when Morse, Cutler and Fink produced a research analysis of public school classes for the emotionally handicapped. This study was designed to identify the salient themes running through programs, the classroom practices, the results from given styles or approaches, the teachers' underlying attitudes and purposes, the teachers' backgrounds, the pupil's perception of the programs, and the underlying theoretical orientations of these programs. These researchers collected two types of information: teacher, pupil, administrator and visitor descriptions of existing conditions, and data on past and future perceived status of the student (Morse et al., 1964, p. 3).

Information acquired from a total of 54 programs covered more than 500 children, which was neither a random nor a statistically representative sample, but was one which followed the distribution of programs through several states. The authors acknowledged some limitations of time, lack of standardization of instruments, questionable test-retest reliability, lack of adequate records of intelligence and achievement test scores, and problems in the utilization of different site visitors (Morse et al., 1964).

The goal of their research was to determine the effects of special education classrooms for emotionally disturbed children upon the children, using pre- and post-test data on school achievement. However, since such data were not available, the authors substituted retrospective data. Ratings of program success were reported in percentages as seen by site visitors and school personnel in categories ranging from "clear failure" to "outstanding success" (Morse et al., 1964, p. 97). With few exceptions, other items were similarly reported.

Morse, Cutler and Fink identified seven types of programs for the emotionally handicapped, defining them as follows:

- (1) psychiatric-dynamic, where individual therapy is expected or required and where the emphasis is on psychiatric involvement from diagnosis until return to regular classes.
- (2) psycho-educational, with an interweaving of educational and clinical theory and an educational emphasis on creative, project-type work.
- (3) psychological-behavioral, with a planned system for changing responses based on the psychology of learning theory with specific remediation techniques.
- (4) educational, an extension of traditional educational procedures.
- (5) naturalistic, with neither an organized approach nor

a specific design, although the teacher takes the "demanding mother" role.

- (6) primitive, featuring the aloof, cold teacher who dominates by fear and coarseness in the rationale and confronting of classroom problems.
- (7) chaotic, with the students exhibiting a constant breakthrough of impulsive behavior while the atmosphere is, possibly, permissive.

In order to determine whether the variety of techniques and methods used by the teachers were part of any meaningful patterns, a factor analysis of teacher methodology and observer rating variables was performed. Pearson Product-Moment correlations were computed and the correlation matrix analyzed. Eleven factors emerged that "were then examined in terms of the variables which loaded on them for what seemed to be meaningful and rational clusters of teacher characteristics and methods" (Morse et al., 1964, p. 64). Factors bore such labels as poor teacher, good teacher, corrective special education syndrome. Scores on these factors were computed for each teacher, and then used to correlate the clusters of teacher activity with basic changes in the students.

The data to determine changes in children were derived from instruments designed to measure the child's perception of present and previous classes and the teacher perception of changes in

children as seen in four classroom behavior dimensions. The children's perception of academic success showed a mean of 2.70 in the previous setting and a mean of 1.95 in the special education setting, $t = 20.30$, $p < .001$. Teacher perception of academic change showed a prior mean of 7.17 and a current mean of 8.55, $t = 8.06$, $p < .001$. Indications were that both teachers and students saw change in the special setting (Morse et al., 1964).

As a final means of understanding the source of the change perceived by the students and teachers, a series of t tests and F tests was performed on variable differences between the seven program types defined as psychiatric-dynamic, psycho-educational, psychological-behavioral, educational, naturalistic, primitive, and chaotic. Findings, statistically significant at the 5 percent level suggested that the effect of the psycho-educational program on the children's perceptions of their own progress was greatest. In addition, the teachers' perceptions of children's changes in self-control favored the psycho-educational setting over others at the same 5 percent level. Other comparisons, done similarly, suggested through the results that the seven program types identified were realistic descriptions of classroom treatment programs (Morse et al., 1964).

Major Reviews of Interventions

Balow

A comprehensive review by Balow (1966) included many

articles on the emotionally disturbed; few could be called research reports. "Prescriptive, action-oriented publications are far more numerous than research publications," noted Balow (1966, p. 121). The fundamental problems he described as needing attention in research reports included the lack of adequate criterion measure, the use of control groups, the lack of adequate sampling, the use of differential treatments, a careful definition of terms, and the exploration of research questions of hypotheses that could be generalized.

Balow's article was restricted to research papers on the topics of identification and characteristics, educational provisions and outcomes, and teacher education. Since no definition of the emotionally/socially handicapped was widely accepted, incidence appeared to vary with the prevailing local definition. Teacher judgment continued to be used as the main criterion for identification. The association of delinquent behavior and school difficulty continued to be well established, as well as that of visual perception problems with those of learning and behavior. Researchers found school academic retardation to be common to this group of students (Balow, 1966, p. 125).

Balow cited the investigation of Morse, Cutler and Fink as the major study to appear in the areas of educational provisions and outcomes. In Balow's report, support for a structured approach to education and classroom management came from several

sources; others advocated the psychotherapeutic and counseling approaches. Balow cited Lewis (1965), however, in concluding that the important element in behavior change was neither psychotherapy nor counseling, but maturation over a period of time. In summary, Balow presented a descriptive review of the literature available up to 1966, which dealt with the emotionally and socially handicapped. While he reported the conclusions of several researchers as to the efficacy of the treatments which they had studied, Balow published neither statistical data nor comparisons of treatment effectiveness.

Glavin and Quay

In 1969 Glavin and Quay undertook a review of the available research literature on the subject of emotionally and socially maladjusted children. They noted growth in public school programs and teacher training facilities. The studies which they reviewed suggested that teacher judgment continued to be used as a major factor in the screening for emotionally disturbed children. According to Glavin and Quay (1969), the lack of a widely accepted definition of maladjusted children served as a source of possible error in research reports in two ways. First, independent variables were not identifiable and therefore could not be generalized to other research settings. Second, undefined variables provided a source of frustration to program developers, who needed to know for whom they were developing models.

In the area of the persistence of emotional disturbance, some studies suggested that "the majority of disturbed children improved without intervention" (Glavin and Quay, 1969, p. 86), or resolved their adjustment problems without help, as Lewis (1965) had stated. The strong relationship between academic success and emotional adjustment was justified in several reported studies, but only one was cited as being methodologically rigorous (Glavin and Quay, 1969, p. 88). This was a study by Robins (1966) who used the global responses of two psychiatrists to compare the adult social and psychiatric outcomes of over 500 child guidance clinic patients with those of 100 normal children. A 30-year follow-up was done on these subjects. Criticism of this study by Glavin and Quay centered upon the differences in variables of IQ, grade level, and total education of the treated and control or normal groups.

Specific Techniques

There have been numerous outcome studies of educational programs for emotionally disturbed students. Imaginative play training and perceptual-motor interventions were found to yield positive changes in body image as well as affective and social gains (Nahme-Huang, Singer, Singer, and Wheaton, 1977). The application of a token reinforcement program in a public school may have been related to improvement in academic achievement as well as to enhanced attendance (O'Leary, Becker, Evans, and

Sandargas, 1969). Other interventions have included the psycho-educational approach, use of psychopharmaceutical drugs, operant conditioning, sensori-motor intervention, and therapeutic teaching.

Operant Conditioning

Operant conditioning was studied by Solnick, Rincover and Peterson (1977). The "engineered" classroom, pioneered by Hewett (1969), was found effective in moving students from special classrooms to regular class settings. The application of a token reinforcement program was found to be related to improved academic achievement, as well as to improved attendance, in behavior disordered students (O'Leary et al., 1960). The relative effectiveness of operant conditioning and play therapy was examined by Ney, Palvesky, and Markley (1971), who found that, in the population of psychotic children tested, improvement in mental age (IQ) and in amount of speech was greater after operant conditioning than after play therapy.

Sensori-motor Intervention

Fassler and Bryant (1971) investigated attention and performance on simple tasks, as well as the classroom attention of seriously emotionally disturbed students. They concluded that under conditions of reduced auditory input a significant number of autistic children improved in classroom attention.

Therapeutic Teaching

Swift and Spivack investigated the specific topic of therapeutic teaching techniques in a 1975 study. Designed to provide a practical description of "procedures which teachers may use to increase behavior conducive to learning," the study was conceived to aid the teacher in remediating or preventing behavioral difficulties (Swift and Spivack, 1974, p. 260). Sources of information for this review were journal articles in which the overt behavioral difficulty was specified so that the reader could see what teaching technique was applied to that particular behavioral problem. Preference was given to reports which provided "reasonable support" for the validity of the technique.

Teaching approaches were identified for the following general categories of behavior: inattentiveness, anxiety, classroom disturbance, restlessness, externalization of blame, hyperactivity, aggression, and defiance. Following each behavior category came descriptions of learning or teaching techniques which had been found to be effective in dealing with that behavior.

No statistical comparison or evaluation of techniques was included in this review. There was, instead, a narrative description of each technique, encompassing methods deemed effective with an entire class or with a single student.

In their summary and discussion, Swift and Spivack found

that the techniques studied, ranging from a smile from the teacher to the tangible reward of toys and candy, had in common the need to stress clarity of rules, alert the child to his own behavior, keep tasks short, establish a positive relationship between student and teacher, and implement an overall treatment plan. They concluded that there were a surprisingly limited number of research studies on teaching techniques, and a corresponding scarcity of studies on specific procedures. There also appeared to be a lack of standard measurement of classroom behavior. The authors stated that "...there is a need for vastly greater knowledge of and communication about effective approaches for the large numbers of children who presently cannot cope with, gain from, or enjoy their school experiences" (Swift and Spivack, 1974, p. 260).

Teacher Awareness of Interventions

An investigation of teacher knowledge of alternative treatment methodologies was published as a doctoral dissertation by Benson (1977). Teachers of the emotionally disturbed in public school programs were questioned or surveyed in respect to their knowledge of commonly identifiable models and strategies used for emotionally disturbed children. In addition, they were asked for their frequency of use of these strategies, their knowledge of them, and their felt needs for more knowledge about any or all of them. Questions were also asked about their teacher training institutions.

Regardless of where they were trained, teachers of the emotionally disturbed used behavior modification techniques most often, according to Benson. Reality therapy was the model used with the next frequency. The teachers felt that their knowledge of behavioral methods was strongest, followed by the reality, ecological, humanistic, psychodynamic, and biophysical models respectively. Teachers felt, by a majority, a need for more knowledge about alternative treatment methods, with the exception of behavior modification techniques (Benson, 1977).

Programmatic/Demographic Variables

Several researchers have investigated the relationship of programmatic and demographic variables and achievement scores with emotionally disturbed students. In a long range study, comparisons were made over a five-year period of Stanford Achievement Test scores for 40 children undergoing psychotherapy and 43 equally handicapped children who received no treatment. No overall differences were found between groups, but achievement was found to be affected by grade level at the beginning of treatment. Those students whose treatment began in third or fourth grade progressed at a faster rate than those who entered therapy in the fifth or sixth grade (Ashcraft, 1971).

Three studies were reported by Glavin and Quay (1969) from which inferences were drawn about the relationship between emotional disturbance and school achievement. In these studies,

the researchers controlled for a number of variables such as intelligence, socio-economic status, "milieu," length of stay in treatment, and type of disturbance. Glavin and Quay reported that these variables were pertinent, but there were no statistical evaluations of the specific effects on achievement or of their interactions with any intervention program documented. Models for learning and behavior changes in the classroom were reviewed without comparisons being made. The trend in classroom approaches to behavioral change and management was reported to be toward the application of behavior modification principles. Most studies reporting behavior modification techniques were typically N = 1 studies, making comparisons difficult. The development of procedures easily and readily available to the classroom teacher, and applicable to the classroom setting, appeared to increase the use of behavior modification among educators, according to Glavin and Quay (1969).

Aggressive classroom behavior is often viewed as a characteristic of an emotionally disturbed student. The relationship between aggressive behavior and school achievement was investigated by Feldhusen, Thurston, and Benning (1970). Research done previously by these same researchers included a longitudinal study of third, sixth and ninth grade students with either aggressive/disruptive or socially approved behavior. Looking for significant differences, the researchers found that those children

labelled aggressive had less affectionate parents than those perceived as demonstrating socially approved behaviors. They were less closely supervised by their parents, and also received less firm discipline. The aggressive/disruptive students performed less well in school in both reading and mathematics than their approved counterparts (Feldhusen et al., 1970).

The 1970 study by these same researchers was a longitudinal analysis of the relationship of classroom behavior to academic achievement. It served to answer the following questions:

- (1) After five years, are aggressive or socially approved youngsters different from one another in terms of academic achievement?
- (2) How are these differences, if any, related to sex or to grade level?

For this study, from a total of 1550 third, sixth and ninth grade students, 568 were nominated as aggressive and 982 as socially approved. From this population a sample of 384 children was drawn randomly. Each child and his or her parent were interviewed; a battery of psychological tests was administered to the students. Test scores (academic achievement and IQ) were obtained from the schools.

Five years later, academic development as reflected in school achievement was determined. As shown in teacher grades for English, science, mathematics and social studies, the

aggressive children were performing on far lower levels than their socially approved peers. Scores on the reading, writing, mathematics, science and social studies sections of the STEP test mirrored this gap between the two groups. The researchers concluded that aggressive or socially approved youngsters differed from one another in terms of academic achievement. They further concluded that there was little relationship or interaction between the behavior and sex or grade level. Feldhusen, Thurston and Benning stressed the need for home assessment as well as thorough assessment of the child's school performance, plus the development of special classes, individualized instruction or private tutoring, and techniques of behavior modification following established principles of Skinnerian operant conditioning. They emphasized the need for precision teaching.

Feldhusen, Thurston and Benning also found it necessary to examine possible differences in mean IQ between the groups of aggressive and socially approved children. An analysis of covariance was used to adjust the difference between achievement means in relation to IQ differences. They also performed analyses of variance for grade level, sex and location of program. With IQ controlled, there was found to be little relationship or interaction of behavior with these other variables.

Summary of Literature Review

Numerous studies have been reported on the outcome effects

of educational programs for emotionally disturbed students. For instance, imaginative play training and perceptual-motor interventions were found to yield positive changes in perception of body image as well as affective and social gains (Nahme-Huang, Singer, Singer, and Wheaton, 1977). The application of a token reinforcement program in a public school may have been related to improvement in academic achievement as well as to enhanced attendance (O'Leary, Becker, Evans, and Sandargas, 1969).

The relative effectiveness of operant conditioning and play therapy in improving the communication and social functioning of psychotic children was examined by Ney, Povesky, and Markley (1971). They determined that improvement in mental age and in amounts of speech was greater after operant conditioning than after play therapy. Fassler and Bryant (1971) investigated attention and performance on simple tasks as well as classroom attention of seriously disturbed children, and concluded that a significant number of autistic students improved in classroom attention under conditions of reduced auditory input.

In a long-range study, comparisons were made over a five-year period between 40 children undergoing psychotherapy and 43 equally handicapped children who received no treatment. No overall differences were found between groups, but achievement was found to be affected by grade at the beginning of treatment, with students in lower grades progressing faster than those in

fifth or sixth grades (Ashcraft, 1971).

Other investigators have analyzed public school classes for emotionally disturbed students. For instance, in a research analysis of public school classes for the emotionally handicapped, Morse, Cutler, and Fink (1964) conducted a series of tests of differences on group and group change variables between program types on 73 programs. They found evidence of meaningful relationships between types of interventions and changes which occurred in the students. Glavin and Quay (1969) reviewed available research literature on children with behavior disorders, and found a need for the development of special methods for teaching those handicapped students.

Feldhusen, Thurston, and Benning (1970) analyzed classroom achievement of aggressive students. In their presentation of a longitudinal analysis of the relationship of classroom behavior to academic achievement, these authors concluded that aggressive and socially approved students differed from one another in terms of academic achievement. They further concluded that there was little relationship or interaction between observed classroom behavior and the students' sex or grade level.

In conclusion, research data suggested that, while there were many methods used to educate emotionally disturbed students, the relative effectiveness of these methods remained unknown. In addition, the relationship of both demographic and programmatic

variables to treatment methods or outcome measures had not been established.

Meta-analysis Background

Many authorities have attempted to deal with the problem of integrating a large body of literature on a particular subject. Traditionally, the starting point was the review of existing literature, where the only consistency was the inconsistencies which appeared in the results of various studies (Light and Smith, 1971). As a result, decision making was confused, threatened and delayed. Previous integration methods have included "vote-taking" and the cluster approach to combining studies.

Vote-Taking

Light and Smith (1971) published a study detailing procedures for resolving contradictions among different research studies, and suggesting criteria for determining when data from dissimilar studies could be pooled. These researchers stated that the best and most systematic of the several approaches prior to their study was the "vote-taking" method. In this technique, all studies having data on a dependent variable and a specific independent variable were examined. Three outcomes were defined: the relationship between the independent and dependent variables was significantly positive, significantly negative, or there was no significant relationship. The category into which the most

studies fell was assumed to yield the truest estimate of the relationship between variables.

Light and Smith described three weaknesses of the voting method. First were "weakened inferences." Since vote-taking did not incorporate the sample size into the procedure, a large study carried the same weight as a small one. Additionally, some studies were not representative in terms of the independent variable. Second, there were "overlooked inferences." Vote-taking only used data for which significant levels were originally computed. If the investigator of the original study did not calculate an important statistic, this datum did not appear in the summary produced by taking a vote. Third, there were "wrong inferences" because the voting method did not allow for effects such as interactions. They argued that "little headway can be made by pooling the work in the conclusions of a set of studies. Rather, progress will only come when we are able to pool, in a systematic manner, the original data from the studies" (Light and Smith, 1971, p. 443).

Cluster Approach to Combining Studies

Light and Smith advocated an alternate strategy to vote-taking for accumulating information, which they called a cluster approach from the ideas of cluster sampling developed in the field of sampling theory. In this perspective for combining studies, the assumption was that each study could be viewed as

a random sample taken from a common population. The cluster was the smallest natural unit available in the data, whether school, classroom or reading group. It was the unit of analysis, and as such was the natural focal point of whatever educational process was under investigation. Light and Smith pointed out that clusters could differ in five specified ways: means of variables, relationship with covariates and the dependent variables, subject by treatment interaction, and uniform features. The clusters could not be combined directly if any of these five differences were found.

If no differences were found, that data could be combined. Light and Smith stated further that if one or more differences were found, along with an explanation of these differences, the researcher could statistically adjust the explained cluster differences and combine the data from the clusters. If no explanation was found for these differences, the data could not be combined. Light and Smith described this approach as one that would let the decision maker know the available alternatives by revealing the specific identification of commonalities among the situations studied.

Meta-analysis Theory

The need for meta-analysis and the rationale for its existence resulted from the growing amount of literature, the many conflicting studies with inconsistent findings, the

particular ability of this method to make use of studies which may be "poorly designed" and therefore discounted or discarded in other integration methods, and the need to "find knowledge in information," or in complete research reviews (Glass, 1976, p. 4). The meta-analysis of research on a topic is directed both toward a quantitative aggregation of findings and a description of the relationships among findings. Meta-analysis provides the means for a valid statistical method to analyze the results of many different studies of treatments of similar populations.

Glass (1976) defined three levels of data analysis: primary analysis, the original analysis of data in a research study; secondary analysis, consisting of the reanalysis of data for the purpose of answering the original research question with better statistical techniques, or answering new questions with old data, and meta-analysis. Meta-analysis is defined as the statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating the findings.

Meta-analysis makes use of studies which Light and Smith would discard in the cluster approach. Glass thus assumes a more liberal position than Light and Smith with regard to the criteria studies must meet before being used in a combined evaluation. In addition, meta-analysis has the potential to discriminate among effects of treatments, and degrees of effectiveness (Glass, 1976).

Criticism of the meta-analysis method of combining studies

has been focused on the integration of different studies. It has been stated that incommensurable studies are forced together, different studies used to answer the same question, or indeed apples are combined with oranges. Glass has responded to this criticism by stating that the respects in which comparable studies must be the same are unspecified; in addition, there is no need to compare studies which are identical since they would have the same findings. "The only studies which need to be compared or integrated are different studies" (Glass, 1977, p. 357).

Glass also indicated that the researcher should integrate measures of the strength of effects or relationships among variables. Since meta-analysis depends upon linear regression techniques, a correlation coefficient can be calculated to measure the amount of common or share variance, and indicate the strength of the probable relationships (Glass, 1977).

Calculations

In meta-analysis research, the primary unit of analysis is the effect size (ES), the difference between the means of the experimental and control groups divided by the within group standard deviation, expressed by the formula:

$$ES = \frac{\bar{X}_e - \bar{X}_c}{SD_{wg}} \quad (1)$$

In comparing the effects of different treatments, the standard

deviation of the control group was used in Formula 1. This allotted equal effect size to equal means (Glass, 1977). The effect size may be computed when data are limited, missing, or expressed in terms other than metrical.

Meta-analysis may be calculated on the outcomes of correlational studies by integrating the correlation coefficients descriptive of the relationship between two variables, while, according to Glass, a complex meta-analysis will yield information in problems dealing with inferential statistics. Regression techniques are used after determining effect size to describe the effect over a passage of time.

Although the concept of effect size is not difficult overall, there are some problems in determining effect size from many articles published in journals. Some research reports omit data about means or standard deviations of experimental and control groups. Many do not use comparison or control groups. Often reports are published which include sample sizes and the statistical significances at a certain level. Sometimes the groups means are given along with an F level. Glass (1977) has devised methods of determining the effect size if:

- (1) t is known along with the size of the experimental and control groups.
- (2) the two sample sizes are known along with the significance level of the mean difference.

(3) the two group means are known along with a value of \underline{F} .

According to Glass, in the first case the second formula would give a conservative estimate of the effect size.

$$ES = \underline{t} \sqrt{1/n_1 + 1/n_2} \quad (2)$$

In the second case, a conservative estimate can be arrived at by setting a \underline{t} ratio equal to the critical value which corresponds to the significance level and using Formula 2. In the third instance, using the square root of \underline{F} as the value of \underline{t} and the second formula will approximate the effect size (Glass, 1977, pp. 366-368).

Meta-analysis requirements

There are two requirements for meta-analysis research. First, the features of the research problem and setting must be measured in quantitative terms. Second, missing data methods are necessary at the meta-analysis state (Glass, 1977). Glass suggested neither a maximum nor a minimum number of studies for meta-analysis research. Instead, he indicated that the number of studies needed in a meta-analysis is a matter of how many questions will be addressed by the data. The statistical methods employed aid in the perception of the answers.

Meta-analysis Studies

In 1977 Smith and Glass integrated the outcome evaluation literature in psychotherapy and counseling. They found

approximately four hundred controlled evaluations of effects. In the meta-analysis, the effect sizes of separate studies became the dependent variables. The independent variables were various features of the study such as type of therapy, age of client, client IQ, duration of therapy. Data analysis for this study was in four parts: descriptive statistics for comparison of therapy types and outcome types; descriptive statistics where behavioral and non-behavioral therapies were compared in the same study; regression analyses in which the effect sizes were regressed onto variables descriptive of the study. The result of this study revealed no differences in the average impact of each class of therapy.

The most important feature of this outcome study was the determination of the magnitude of the effect of therapy, as stated by Smith and Glass (1977). In their defense of this technique, the researchers stated the effect size could be calculated on any outcome variable they chose to measure. Mixing different outcomes such as self-esteem, anxiety, and school achievement were seen as defensible since all were related to the concept of "change" and each therapist had decided on a course of treatment based on each client's individual needs.

Glass and Smith have published several major meta-analysis research reports, as well as descriptions of the meta-analysis technique, since 1976. Doctoral studies using the statistical

method of meta-analysis have been published yearly since that time. While the number of studies used in these analyses has ranged from less than 50 to several hundred, the researchers have reported the technique to be effective in analyzing relationships between variables. These findings are viewed by the researchers as providing needed information to sociologists, teachers, and school planners (White, 1976).

In a study of the relationship between socio-economic status and school achievement, White, in a 1976 doctoral dissertation at the University of Colorado, analyzed 600 correlation coefficients to determine the relationship of their magnitude to socio-economic status, achievement, and subject age. He determined that the correlation between socio-economic status and achievement is below that which is generally accepted, providing information which should be helpful to sociologists and to school planners (Glass, 1976).

Hartley (1977) summarized 153 studies of the efficacy of four techniques of mathematics instruction using meta-analysis. Results showed that tutoring was a superior technique to computer assisted instruction, individual learning packets and programmed instruction. The cost-effectiveness of each technique was also noted, as an aid to administrative decision making. Meta-analysis research was applied the following year in a report comparing the effects of modern mathematics with those of

traditional mathematics (Athappilly, 1978). His summary of 134 studies on new mathematics curricular offerings showed evidence of change in students attributable to new programs. Significant changes appeared in academic achievement, attitude toward mathematics, and understanding concepts and skills of computation.

The effectiveness of college reading-study programs was examined through meta-analysis techniques. Using a sample consisting of 28 studies, Saunders (1979) found that college reading-study programs had statistically significant overall beneficial effects on college students. In his discussion Saunders noted that the literature contained many studies which omitted control groups and descriptions of content and operational factors.

A meta-analysis of the effects of special classes, resource rooms, and other treatments on exceptional children used data from 87 primary research studies. This study (Carlberg, 1979), found special classes inferior to regular class placement for children with below average intelligence test scores, but superior to regular class placement for students with learning disabilities.

Glass and Smith joined forces again in 1979 to investigate the relationship of class size to academic achievement. The meta-analysis of the research from the literature integration was based heavily on precise quantitative description. A strong relationship between class size and achievement was discovered, more so at the secondary levels than at the lower elementary

levels. Glass and Smith indicated that more was learned in smaller classes than in larger ones; as the class size increased, the achievement scores tended to decline.

From the middle of 1980 through the end of 1981, the technique of meta-analysis was applied almost monthly to a research project leading toward a doctoral degree. Topics investigated included aggregating the findings of research in inquiry teaching (El-Nemr, 1980), a meta-analysis of locus of control research (McClanahan, 1980), synthesization of research in the relationship between student rating of instruction and student achievement (Cohen, 1980), and a meta-analysis of research on methods of teaching mathematical problem solving (Marcucci, 1980). Meta-analyses were also published on the research of in-service teacher education (Joslin, 1981), the teaching-learning of reading (Madamba, 1980), the relationship of teacher praise and student achievement (Wilkinson, 1981), improved academic achievement and race relations (Israel, 1981), college teachers' attitudes (Handley, 1981), and methods of science instruction (Aiello, 1981).

Meta-analysis Summary

Meta-analysis is a statistical method used to integrate the results from many studies for the purpose of comparison. It has been used in many dissertations, as well as in published research reports. In meta-analysis, data from poorly designed or executed

studies does not have to be discarded, lost to the reviewer, according to Glass (1977), since many weak studies can add up to a strong conclusion or "imperfect studies can converge on a true conclusion" (Glass, 1977, p. 358). Determining the effect of treatment or the size of the effect has priority over determining the significance of the finding, in meta-analysis evaluation.

The number of studies combined may range from two dozen to over two hundred; the number is not as important as the quality of research reporting, according to Glass (1976). Through this technique the researcher can discover the strength and the importance of a relationship between variables. Meta-analysis has been applied in studies to determine the relative effectiveness of types of psychotherapy (Glass and Smith, 1977), the relationship between socio-economic status and academic achievement (White, 1976), and the relationship of class size to academic achievement (Glass and Smith, 1979). Meta-analysis has also been applied to study the efficacy of mathematics instruction (Athappilly, 1978), college reading-study programs (Saunders, 1979), and methods of science instruction (Aeillo, 1981).

Chapter Summary

Many methods exist for teaching emotionally disturbed students, including positive reinforcement, psychodynamic intervention, behavior modification techniques, reduction of stimuli, counseling, and the application of traditional educational

methodology. Investigators have studied these techniques, as well as their demographic and programmatic variables, in an effort to meet the needs of this handicapped population.

Morse, Cutler, and Fink (1964) concluded that the students they interviewed perceived the effectiveness of a psycho-educational program as being greater than that of the six other programs identified as being used to educate emotionally disturbed students. Balow (1966), calling the investigation of Morse et al., a major study, concluded that the important element in behavior change may be maturation over a period of time.

Glavin and Quay (1969) reported that variables of IQ, socio-economic status, "milieu," length of stay in treatment, and type of emotional disturbance were pertinent to the relationship between emotional disturbance and school achievement. In a longitudinal analysis Feldhusen, Thurston, and Benning (1970) concluded that there was little relationship or interaction with behavior change and grade level, sex, or program location.

A teacher survey conducted by Benson (1977) revealed that teachers felt that they needed more knowledge about alternate treatment modalities. Behavior modification was the technique employed by the majority of teachers who responded to the survey.

Many methods have been employed to teach emotionally disturbed students. The latest statistical technique proposed for comparison of these methods is meta-analysis (Glass, 1976). Meta-analysis is defined as the statistical analysis of a large

collection of studies for the purpose of integrating the findings. The results or outcome measures of studies of interventions are transformed into effect size scores (ES), which are then compared for effectiveness. Through regression analysis, relative effectiveness can be determined and, when variables of the interventions and populations have been identified, the variables' effects upon the outcome measures determined. Meta-analysis has been used in a study of the effectiveness of types of psychotherapy (Glass and Smith, 1977), and the relationship of class size to academic achievement (Glass and Smith, 1979). The technique has been used in over 35 doctoral dissertations, the topics of which have ranged from comparison of methods of mathematics instruction to college reading-study programs. Additionally, meta-analysis has been used to compare the effects of special class placements for learning disabled and mentally retarded youngsters.

A discussion of the methodology used in the present study is presented in Chapter 3. The study was designed to determine the relative effectiveness of educational treatment programs for emotionally disturbed students through the statistical technique of meta-analysis.

Chapter 3

Methodology

A description of the methodology used to investigate the relative effectiveness of educational treatment programs for emotionally disturbed students is presented in Chapter 3. The chapter includes (a) a description of the population and sample, (b) project design, (c) a description of the data base, (d) hypotheses to be tested, and (e) data analysis procedures.

Research Population

The population of this study consisted of experimental reports published from 1969 through the end of 1979 in sixteen journals. The selection of these journals followed a detailed study of nine published bibliographies, the topics of which were emotional disturbances in children. Seven of these bibliographies were published by the Council for Exceptional Children as part of the Exceptional Child Bibliography Series. The eighth and ninth dealt with the definition of emotional disturbance in children (Lakin, 1979) and problem behavior in schools (Wood and Zabel, 1975). References in these bibliographies encompassed a total of thirty-six journals; those with the largest number of references were selected for this study. (See Appendix A for a list of journals used in this study.)

Research Sample

A sample of two hundred twenty experimental studies was

randomly drawn from the published research report population.

Criteria for selection of the research reports were as follows:

- (1) articles appeared in one of the selected journals.
- (2) articles presented firm data on more than one group;
a control group, comparison group, or control data was
included.
- (3) subjects were school aged - two to twenty-one.
- (4) subjects were in a school setting, either day-care or
institutional.
- (5) subjects were labelled as behavior disordered,
emotionally disturbed, autistic or schizophrenic.
- (6) research documented measurable change in behavior of
subjects.
- (7) journal article was published between 1969 and 1979.

Project Design

The data contained in the selected studies were coded for analysis of effectiveness of treatment programs for emotionally disturbed students. The intervention described in each study was placed into one of eleven treatment categories, each a variation of psychoeducational, structured-behavioral, academic, sensori-neurological, or psychopharmaceutical interventions. Outcome results were also coded as achievement measures, and statistical methods of comparison, multiple correlation and regression analysis, employed. This design followed the

meta-analysis study by Glass (1976) which compared the effectiveness of types of psychotherapy.

Following the model of coding characteristics used in the meta-analysis on classroom size and academic achievement published in 1979 by Glass and Smith, these broad categories were determined to be most applicable to a population by treatment study: identification, treatment program characteristics, student demographics, and outcome variables. Treatment program characteristics were length of time of treatment, number of students, program facilitator, program setting, and type of treatment program. Variables of student demographics were pupil ability, grade level, age, sex, socio-economic status, medication, and diagnosis. Outcome variables were measures of general achievement, reading achievement, mathematics achievement, and social skills/classroom behavior. (See Appendix B for a detailed breakdown of coding.)

Description of the Data Base

The two hundred twenty journal articles reporting data on classroom treatment programs for emotionally disturbed students provided 235 measures of effect size and 418 measures of percent change. The resulting comparisons were based on a total of 2,338 students in studies covering ten years of research, 1969-1979. The total body of evidence was described, partly in quantitative terms, through the use of frequency distributions of

characteristics of the programs studied and of the students involved in these programs.

Demographic Characteristics

Data on the students covered in the two hundred twenty studies revealed that 2,025 or 86.6 percent were male and 313 or 13.4 percent female. The average age of the students was nine years, nine months, average intelligence score 90.8. The approximate length of time spent in a treatment program was a little over two years; 24.2 months.

As shown in Table 1, the diagnostic categories in which the majority of the students were placed were either behavior disordered or emotionally disturbed. The term "educationally handicapped" was used in some geographical areas, notably the state of California, to designate a child in need of special services.

Table 1
Diagnostic Categories of Students

Diagnosis	Number of Studies
Behavior disordered	74
Emotionally disturbed	63
Learning disordered/handicapped	29
Autistic/schizophrenic	21
Hyperactive	17
Delinquent	14
Impulsive	2

Refer to Table 2 for data on the grade levels and SES of the students involved in the studies. Most of the studies were conducted either in ungraded classrooms or at the upper elementary levels. The socio-economic status of the students was reported in 51 of the 220 studies. While the incidence of emotional disturbance could have been expected to follow the normal population distribution, there was a skew to the data. The middle and lower socio-economic classes provided the base for the majority of published studies.

Table 2
Grade Level and Socio-economic Status

Grade Level	Number of Studies	SES	Number of Studies
Ungraded	77	Lower	17
K-2	35	Lower-middle	13
3-5	66	Middle	18
6-8	31	Upper-middle	3
9-12	11	Upper	11

Programmatic Characteristics

As shown in Table 3, the frequency distribution of the types of treatment programs varied. The structured-behavioral approach for social skills remediation was used in 30 percent of the reports, while the psychoeducational approach was utilized in

14 percent of the treatments. Cognitive training for academic skills remediation was the technique explored in 10 percent of the cases.

Table 3
Frequency of Treatments Reported

Treatment	Number of Studies
Psychoeducational	40
Structured/behavioral (social)	68
Structured/behavioral (academic)	32
Sensori-motor	10
Psychopharmaceutical	1
Academic	19
Counseling (family, teachers)	7
Counseling (group)	7
Counseling (individual)	4
Cognitive training (academic)	22
Cognitive training (behavioral)	10

Note. Total studies = 220.

The treatment programs were carried out in a wide variety of settings. One-fourth of the studies came from residential facilities; another fourth from regular classrooms, with almost as many reported from self-contained classes in regular school

settings. In the total studies, 216 or 98 percent had no medication reported for the students. Refer to Table 4 for the frequency distribution of program settings.

Table 4
Types of Treatment Settings

Settings	Number of Studies
Residential	59
Day-care	35
Self-contained	49
Resource	20
Regular	57

Note. Total studies = 220.

The program facilitator was defined as the person most responsible for carrying out the educational treatment program. As can be seen in Table 5, the teacher in the classroom, in more than half of the studies, had the primary responsibility of implementing, monitoring, and recording the progress of the treatment. The school psychologist was responsible for 22 percent of the studies, with the remainder divided among other persons.

Table 5
Distribution of Program Responsibility

Facilitator	Number of Studies
Teacher	118
Psychologist	48
Consultant	19
Volunteer	6
Paraprofessional	6
Physician	5
Other	18

Note. Total studies = 220.

Research Hypotheses

The following hypotheses were addressed in this study:

1. There are significant differences in the total effect sizes of educational treatment programs for emotionally disturbed students.
2. There are significant differences in the effect sizes of the specific outcome measures of mathematics achievement, reading achievement, general achievement, and social skills for each of the educational treatment programs.
3. Program elements and student demographics interact with the treatment programs to produce a significant effect

upon the outcome measures of general achievement, reading achievement, mathematics achievement, and social skills scores of emotionally disturbed students.

Data Analysis

The data were analyzed by use of two methods; meta-analysis defined as the statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating the findings, and percent change. The treatment programs were analyzed for effectiveness individually and grouped into general categories.

Meta-analysis

In the meta-analysis, the primary unit of analysis was the effect size, (ES), defined as the difference between the means of the experimental group and the control group divided by the control group standard deviation (Glass, 1977). The aggregates of the scores for the studies were compiled into an effect size for each type of treatment; the distance from the mean for each treatment was shown as a standard score. In comparing the effects of different groups, the standard deviation of the control group was used.

In this analysis, the effect size was the "dependent variable." The "independent variables" were identification variables, treatment program characteristics, and student demographics. Combinations of these variables and of their

components were used in the meta-analysis. Techniques in the meta-analysis included the use of both multiple correlation statistics and regression analysis in the analyses of effects for traditional demographic variables.

Individual Treatments

Each classroom intervention was placed into one of eleven treatment categories, which were variations of psychoeducational, structured-behavioral, academic, sensori-neurological, and psychopharmaceutical interventions. An inter-judge reliability study of the appropriateness of placement was conducted through the use of an independent judge. The ratio of agreement was over 97 percent, with 214 studies out of 220 identically categorized. The six programs where disagreement occurred were placed in appropriate categories after discussion.

Grouped Treatments

Because of limited data in some treatment modalities, it was necessary in order to compare effects to use a coarser level of analysis than the original eleven program categories. The treatments were therefore grouped into five general categories (psychoeducational, structured-behavioral, academic, sensori-motor, and psychopharmaceutical) so that, even with limited data, the effect sizes could be compared. The mode of treatment called psychoeducational was combined with individual, group, family and teacher counseling since all were concerned with the establishment of a

learning atmosphere which would be compatible with the psychological needs of the student. Academic and social structured-behavioral treatment interventions were combined since both utilized the techniques and the strategies of adaptive behavior change, following established principles of behavior modification. Academic and cognitive training in academic and in behavioral areas were grouped together since they dealt with an extension of traditional educational procedures.

The other approaches, sensori-neurological and psychopharmaceutical, were analyzed separately, because of the limited number of data points available in each group. This was similar to the approach used in the meta-analysis of the effect of psychotherapy (Smith and Glass, 1977, p. 157). The hypotheses to be examined for the grouped treatments were identical to those proposed for the treatment programs which were analyzed individually.

Percent Change

Additional validation of the meta-analysis results was provided through a percent change analysis, determined for both individual and grouped studies. It was arrived at by dividing the difference between the pre-test and post-test scores by the pre-test mean, and multiplying the result by one hundred. The percent change then became the dependent variable; the independent variables were identical to the ones used in the meta-analysis.

Summary of Methodology

This study investigated the effectiveness of educational treatment programs for emotionally disturbed students. From the population of research reports published during a ten-year period, 1969-1979, two hundred twenty studies which met specified criteria were randomly selected to form the study sample. Coding characteristics of the studies were described in order to clarify the choice of variables important to the statistical analyses. The effect size, a standard score, was defined as the dependent variable; independent variables were elements of student demographics, intervention programs, and outcome measures.

The stated hypotheses examined the general effectiveness of educational treatment programs for emotionally disturbed students, the relative effectiveness of these programs on specific outcome measures, and the influence of certain demographic and programmatic variables such as age, IQ of student, or location and length of program.

Multiple correlation and regression analyses were the techniques utilized to determine the effectiveness of the educational treatments, the effects of the variables on these treatments, and the interaction effects which resulted. Chapter 4 includes an analysis of the results of the hypothesis testing.

Chapter 4

Results

The results of statistical analysis of data to determine the relative effectiveness of educational treatment programs for emotionally disturbed students are presented in Chapter 4. These results are reported in four sections: Hypothesis 1, Hypothesis 2, Hypothesis 3, and an analysis of the program variables affecting outcome measures

The first two hypotheses were tested for single and for grouped treatments. Statistical analysis through meta-analysis and percent change were utilized to test both hypotheses. The third hypothesis was tested only for grouped treatments by multiple regression analysis.

Hypothesis 1

Hypothesis 1 stated that there are significant differences in the total effect sizes of the educational treatment programs for emotionally disturbed students. Results are presented for single and for grouped treatments.

Effect Size - Single Treatments

The effect size of each of the treatments was calculated from the formula $ES = (\bar{X}_e - \bar{X}_c) / SD_c$. The average effect size per treatment ranged from 1.49 to 0.13. Regression analysis through Duncan's Multiple Range Test, $\alpha = .05$, revealed that the means of the eleven treatments did not differ significantly from one another.

Conclusion. - The first hypothesis is rejected; there are no significant differences in the total effect sizes of the eleven treatment methods.

Percent Change - Single Treatments

Regression analysis of the average percent change (PCTCH) was also carried out for the educational treatment programs. The mean percent change ranged from 94.5 percent for students receiving academic training to 14.4 percent for those who received individual counseling. The results, analyzed through Duncan's Multiple Range Test for Variables, showed no statistically significant differences between any of these treatment means.

Conclusion. - The first hypothesis is rejected. The total percent change means of the individual treatment programs are not significantly different. See Table 6 for the mean effect sizes and percent changes of single treatments.

Effect Size - Grouped Treatments

Statistical analysis of the effect sizes of the five grouped treatment programs was determined through a Regression Analysis using Duncan's Multiple Range Test for Variables. No statistically significant differences appeared among grouped treatments.

Conclusion. - The first hypothesis is rejected; there are no significant differences in the total effect sizes of the five grouped treatment methods.

Table 6
Mean Effect Sizes and Percent Changes of Single Treatments

Type of Treatment	Effect Size	Percent Change	Grouping ^a
Cognitive training (academic)	1.49	46.6	A
Cognitive training (behavioral)	1.45	40.5	A
Counseling (individual)	1.33	14.4	A
Structured/behavioral (social)	1.23	69.8	A
Structured/behavioral (academic)	.90	66.3	A
Academic	.89	94.5	A
Psychoeducational	.75	40.4	A
Sensori-motor	.73	49.6	A
Counseling (family)	.52	56.0	A
Counseling (group)	.52	17.7	A
Psychopharmaceutical	.13		A
Engineered		41.5	A

Note. Results obtained by Duncan's Multiple Range Test for Variables, alpha = .05.

a. Means with the same letters are not significantly different.

Percent Change - Grouped Treatments

Percent change was also computed for the grouped treatments. Only four groups were compared because the scores for the psycho-

pharmaceutical group treatment were suitable only for calculating effect size. Statistical analysis for the percent change was achieved through Duncan's Multiple Range Test for Variables. There were no statistically significant differences among four grouped treatments.

Conclusion. - The first hypothesis is rejected. There are no significant differences in the average of the total percent changes of the four grouped treatments. See Table 7 for the mean effect sizes and percent changes of grouped treatments.

Table 7

Effect Sizes and Percent Changes of Grouped Treatments

Type of Treatment	Effect Size	Percent Change	Grouping ^a
Psychoeducational	.75	37.9	A
Structured/behavioral	1.14	67.3	A
Academic	1.21	62.8	A
Psychopharmaceutical	.13		A
Sensori-motor	.73	49.6	A

Note. Results obtained by Duncan's Multiple Range Test for Variables, $\alpha = .05$.

a. Means with the same letters are not significantly different.

Hypothesis 2

Hypothesis 2 stated that there are significant differences

in the effect sizes of the specific outcome measures of general achievement, reading achievement, mathematics achievement, classroom behavior (social skills) or total effect size for each of the educational treatment programs for emotionally disturbed students. Results are presented for single and for grouped treatments.

Effect Size - Single Treatments

The effect size (ES) of the eleven treatments was calculated separately for each of the following: general achievement, reading achievement, mathematics achievement, and social skills. Additional statistical analysis computed a total effect size for each type of treatment, which was analyzed for the first hypothesis.

Using Duncan's Multiple Range Test, with the score variables as dependent measures and the eleven treatments as independent measures, the mean effect size was computed for each outcome. This mean effect size for change ranged from .580 for mathematics achievement to 1.238 for general achievement. General achievement scores showed the greatest gain; mathematics scores the least overall improvement. As shown in Table 8, reading achievement and social skills were significantly different from the other outcome measures at the .05 percent level of significance.

Table 8
Mean Effects of Single Educational Treatments on Outcome Measures

Outcome	Effect	No.	S.D.	\underline{F}	$p <$	\underline{r}^2
	Size	Studies				
General achievement	1.28	24	.996	1.08	.417	.32
Reading achievement	.90	27	1.189	3.01	.029*	.47
Mathematics achievement	.58	28	.486	.40	.846	.08
Social skills	1.04	57	.743	2.59	.013*	.26
Total effect size	1.02	99	.822	1.40	.194	.14

Note. Results obtained by Duncan's Multiple Range Test for Variables.

* $p < .05$

Each outcome measure was also analyzed independently of the others. Analysis of the general achievement score revealed no significant differences among the eight treatments for which general achievement were reported. The mean effect size for general achievement ranged from 2.305 to .551, standard deviation .996, $\underline{F} = 1.08$, $p < .46$. No significant differences were found among the six treatments analyzed for mathematics achievement scores as computed by Duncan's Multiple Range Test for Variables. Means of the effect sizes for mathematics achievement ranged from 1.59 to .460, $\underline{F} = 40$, $p < .84$.

For reading achievement, a significant difference was

found among treatments, with the mean reading achievement of 4.233 reported for cognitive training (academic) statistically significant ($F = 3.01$, $p < .02$). Means of the other treatments which had no significant effects upon reading achievement varied from .919 to .256.

Statistical analysis, using Duncan's Multiple Range Test, of social skills scores indicated a significant difference among reported treatments. The structured-behavioral method yielded an effects size for social skills whose mean was 2.019, $F = 1.59$, $p < .013$. Means for the other treatments ranged from 1.669 to .071.

Conclusion. - The second hypothesis is accepted. As reported in Table 9, there are significant differences among the effect sizes of the outcome measures of reading achievement and social skills.

Percent Change - Single Treatments

A percent change analysis was also computed for eleven treatments against the outcome measures of general percent change, mathematics percent change, reading percent change, social skills percent change, and total percent change. When the treatments were regressed against the outcome measures, no significant differences were found for general percent change or for reading percent change. A statistically significant effect was found for the engineered classroom upon math percent change and for structured-behavioral treatment upon social skills change.

Table 9

Single Treatments Affecting Outcome Measures (Effect Size)

Treatment	Outcome Measures			
	General	Reading	Mathematics	Social
	Achievement	Achievement	Achievement	Skills
Psychoeducational	.55	.40	.61	.83
Structured-behavioral (social)	1.99	.27	.47	1.13
Structured-behavioral (academic)	2.30	.59	.67	2.02*
Sensori-motor	.72	.25	.51	.88
Psychopharmaceutical				.13
Academic	1.00	.92	.46	.84
Counseling (family)	.74			.07
Counseling (group)		.64		.54
Counseling (individual)				1.33
Cognitive training (academic)	1.50	4.24*	.86	.88
Cognitive training (behavior)	1.02			1.67

Table 9 (continued)
Single Treatments Affecting Outcome Measures (Effect Size)

Treatment	Outcome Measures			
	General Achievement	Reading Achievement	Mathematics Achievement	Social Skills
DF	16	20	22	46
MS	.99	1.41	.12	.55
F	1.08	3.01	.40	2.59
p<	.41	.02*	.84	.01*
SD	.99	1.18	.48	.74

Note. Results obtained from Duncan's Multiple Range Test for Variables.

* $p < .05$

Table 10

Single Treatments Affecting Outcome Measures (Percent Change)

Treatment	Outcome Measures			
	General	Reading	Mathematics	Social
	Achievement	Achievement	Achievement	Skills
Psychoeducational	47.88	12.70		33.73
Structured-behavioral (social)	29.68	58.93	7.05	72.37
Structured-behavioral (academic)	95.90	32.81	26.48	110.46*
Sensori-motor	72.77			26.46
Engineered		36.24	77.94*	10.38
Academic	27.90	152.20	30.00	35.16
Counseling (family)				56.08
Counseling (group)				17.72
Counseling (individual)				14.40
Cognitive training (academic)	51.98	60.18	11.75	37.47
Cognitive training (behavioral)	69.25			33.85

Table 10 (continued)
Single Treatments Affecting Outcome Measures (Percent Change)

Treatment	Outcome Measures			
	General Achievement	Reading Achievement	Mathematics Achievement	Social Skills
DF	39	27	22	124
MS	5440.67	29045.2	426.78	7074.73
F	.80	.54	8.51	1.90
p <	.57	.74	.0003*	.05*
SD	73.76	170.42	20.65	84.11

Note. Results obtained from Duncan's Multiple Range Test for Variables.

* p < .05

Conclusion. - The second hypothesis is accepted. There is a significant difference among the effect sizes of the outcome measures, as shown in Table 10.

Effect Size - Grouped Treatments

Multiple regression techniques were used to calculate the effect sizes of the broadly grouped treatment categories against each of the outcome variables of general achievement, reading achievement, mathematics achievement, social skills, and total effect size. As can be seen in Table 11, the effect size means in achievement areas ranged from 1.238 to .580, or from one-half to more than one standard deviation from the mean.

Table 11

Mean Effects of Grouped Treatment Programs on Outcomes

Outcome	Effect Size	No. Studies	S.D.	\bar{F}	$p <$	r^2
General achievement	1.28	24	.905	2.86	.05*	.30
Reading achievement	.90	27	1.428	1.13	.35	.12
Mathematics achievement	.58	28	.487	.02	.99	.00
Social skills	1.03	57	.770	1.42	.23	.09
Total effect size	1.02	99	.826	1.76	.14	.07

Note. Results obtained from Duncan's Multiple Range Test for Variables.

* $p < .05$

Analysis of each outcome measure was accomplished through Duncan's Multiple Range Test for Variables. For general achievement scores, structured-behavioral treatment produced a statistically significant effect compared with the other grouped treatments, with an effect size of 2.044, two standard deviations from the mean ($F = 2.86$, $p < .05$).

No significant differences were noted among grouped treatments in reading achievement scores, although treatment means ranged from 1.441 to .256. There were also no significant differences found for grouped treatments analyzed against the mathematics achievement scores, the social skills scores, or the total effect size scores.

Conclusion. - The second hypothesis is accepted. As can be seen in Table 12, the effect size of the grouped structured-behavioral treatment upon the outcome measures is significantly different from that of the other treatments.

Percent Change - Grouped Treatments

Multiple regression statistical techniques were used to calculate the percent change of the four broadly grouped treatment categories upon each of the outcome measures of general percent change, reading percent change, mathematics percent change, and total percent change. Analysis of the results was accomplished through use of Duncan's Multiple Range Test for Variables. One statistically significant interaction was noted,

Table 12

Grouped Treatments Affecting Outcome Measures (Effect Size)

Treatment	Outcome Measures			
	General Achievement	Reading Achievement	Mathematics Achievement	Social Skills
Psychoeducational	.627	.522	.618	.794
Structured-behavioral	2.044*	.460	.574	1.278
Academic	1.394	1.471	.593	1.005
Psychopharmaceutical				.133
Sensori-motor	.715	.256	.509	.887
DF	20	23	24	52
MS	.819	2.040	.236	.594
F	2.86	1.13	.02	1.42
p <	.05*	.35	.99	.23
SD	.905	1.428	1.486	.770

Note. Results obtained from Duncan's Multiple Range Test for Variables.

*p < .05

as shown in Table 13. Structured-behavioral classroom treatment had a significant effect upon the social skills scores. No significant change was computed for any other treatments upon any outcome measure.

Conclusion. - The second hypothesis is accepted in the percent change analysis. The percent change of the grouped treatment methods upon the outcome measures is not equal.

Hypothesis 3

Hypothesis 3 stated that program elements and student demographics react with the treatment programs to produce a statistically significant effect upon general achievement scores, reading achievement, mathematics achievement, social skills scores, or total achievement. The results were determined by statistical techniques of multiple regression.

Regression analyses were performed for many smaller portions of the entire data set in an attempt to determine which, if any, characteristics of the study might mediate the relationship between type of educational treatment and classroom achievement. Factors employed in splitting the data base to determine interactions were diagnosis of student, program length, program facilitator, IQ scores, grade level in school, socio-economic level (SES), and program setting. The results of these separate analyses are presented through a discussion of each independent variable.

Table 13

Grouped Treatments Affecting Outcome Measures (Percent Change)

Treatment	Outcome Measures			
	General	Reading	Mathematics	Social
	Achievement	Achievement	Achievement	Skills
Psychoeducational	47.88	12.70		35.66
Structured-behavioral	68.63	38.11	41.04	72.86*
Academic	47.88	112.76	20.87	35.91
Sensori-motor	72.66			26.46
DF	42	30	25	131
MS	5544.83	27161.6	848	6982
F	.032	.87	3.20	2.82
p <	.81	.43	.08	.03*
SD	74.46	164.80	29.12	83.56

Note. Results obtained from Duncan's Multiple Range Test for Variables.

*p < .05

Diagnosis

Significant interaction occurred between treatment and diagnosis upon general achievement scores. The specific diagnosis of hyperactive and the structured-behavioral treatment program had a strong relationship ($F = 4.02$, $p < .03$). The amount of common variance was 73 percent. There was no significant interaction between treatment and diagnosis in reading achievement scores. No significant interaction existed between type of treatment and diagnosis upon either mathematics achievement or social skills improvement. The total effect size as well showed no significant interaction between diagnosis and type of treatment.

Program Length

There was significant interaction between program length and type of treatment, with a program length of two weeks interacting with structured-behavioral grouped treatments to produce a mean general achievement score of 3.48 ($F = 4.77$, $p < .04$). Common variance was 86 percent. No significant interaction occurred between treatment program and length of treatment on reading achievement scores or mathematics achievement scores. However, a significant difference did appear in the interaction between treatment and program length on social skills, where structured-behavioral treatment and program length of eight weeks produced a mean effect size score of 2.64 for social

skills improvement ($F = 3.90$, $p < .02$). Common variance was 73 percent. No significant difference was evident in the relationship between total effect size, program length, and treatment.

Program Facilitator

In this analysis, both treatment and program facilitator appeared to interact significantly to alter the effect size of the general achievement scores, with the structured-behavioral treatment program initiated by the school psychologist having an effect size of 2.318 ($F = 4.61$, $p < .02$). The amount of shared variance was 74 percent. No significant effect size change was noted from the interaction of program facilitator and treatment on reading achievement scores, mathematics achievement scores, or social skills scores. The interaction between treatment type and program facilitator had no significant effect upon the total effect size score.

Grade Level

Multiple regression analysis was performed on treatment and grade level interaction. For general achievement scores, a statistically significant interaction existed between structured-behavioral treatment program and grade level kindergarten through second grade ($F = 3.41$, $p < .04$); mean general achievement score for this interaction was 2.59. There were no significant treatment/grade level interactions for reading achievement scores, social skills scores, or total effect size scores.

IQ

The interaction of IQ and grouped treatments was examined in the areas of general achievement, mathematics achievement, reading achievement, social skills improvement and total effect size scores. Because of scattered data, computations of significance could not be thoroughly carried out.

Program Setting

Using Duncan's Multiple Range Test for Variables as the statistical analysis, there was no significant interaction between program setting and type of treatment on any of the outcome variables.

Socio-economic Setting

No significant interactions between socio-economic settings and group treatments were calculated on any of the outcome measures; data were limited. Scores were computed using Duncan's Multiple Range Test for Variables.

Summary of Variable/Treatment Interaction Analysis

When the seven demographic/programmatic variables of diagnosis, program length, program facilitator, grade level, intelligence, program setting and socio-economic status were regressed against the five grouped treatment programs, significant results were noted. There was significant interaction between diagnosis and treatment upon general achievement scores. Program length and treatment interacted significantly upon general achievement

scores and upon social skills scores.

Treatment and program facilitator had significant interaction upon general achievement scores, as did grade level and treatment. IQ and treatment yielded no significant interactions upon any of the outcome measures. There was no statistically significant interaction between program setting and treatment or socio-economic status and treatment. These results are summarized in Table 14.

Table 14

Summary of Variable/Treatment Interaction Analysis

Variable	Treatment	Outcome	r^2	F	p <
Diagnosis-hyperactive	Str.-beh.	Gen. ach.	.73	4.02	.04
Prog. length-2 weeks	Str.-beh.	Gen. ach.	.85	4.77	.05
Prog. length-8 weeks	Str.-beh.	Social skills	.72	3.90	.02
Prog. fac.-psychologist	Str.-beh.	Gen. ach.	.74	4.61	.02
Grade level - K-2	Str.-beh.	Gen. ach.	.53	3.41	.04

Note. Results obtained by Duncan's Multiple Range Test for Variables.

Conclusions. - The third hypothesis stated that the seven variables interact significantly with the grouped treatments to produce a statistically significant effect size. This hypothesis is accepted. There are significant interactions between demographic and programmatic variables and treatment programs, which affect the outcome measures.

Program Variables Related to Outcome Measures

After examination of the interactions between program variables and classroom treatment, the program variables were evaluated to determine their effects upon the outcome measures of achievement. Each of these variables, with the exception of socio-economic setting, had a statistically significant relationship to an outcome measure, with effect sizes ranging from 1.255 to 4.750. For example, the specific diagnosis variable of hyperactive was related to the outcome measure of general achievement, while the specific diagnosis variable of emotionally disturbed was related to the outcome measure of reading achievement. A detailed description of these relationships is presented in Table 15.

Summary of Results

Hypothesis 1

Three hypotheses were addressed in this study. The first hypothesis stated that there are statistically significant differences in the total effect sizes of educational treatment programs for emotionally disturbed students. According to statistical analysis through Duncan's Multiple Range Test for Variables, the means of the eleven tested treatments were not different from one another. The hypothesis was rejected. When the eleven treatment programs were grouped into five large categories, the means were not different and the hypothesis was

Table 15

Variables Related to Outcome Measures

Variable (General)	Variable (Specific)	Outcome Measure	Mean Effect Size
Diagnosis	Hyperactive	General achievement	2.18*
Diagnosis	Emotionally disturbed	Reading achievement	2.39*
Program length	2 weeks	General achievement	2.83*
Program length	4 weeks	Reading achievement	4.75*
Program length	8 weeks	Social skills	2.25*
Program length	2 weeks	Total effect size	2.83*
Program facilitator	Psychologist	General achievement	2.18*
Program facilitator	Teacher	Social skills	1.23*
Grade level	K-2	General achievement	1.85*
Grade level	K-2	Total effect size	1.39*
Grade level	Ungraded	Total effect size	1.26*
Setting	Residential	Reading achievement	2.20*

Note. IQ was significantly related to each of the outcome measures.

* $p < .05$

rejected. Percent change analysis produced the same results. The first hypothesis was rejected.

Hypothesis 2

The second hypothesis stated that there are significant differences in the effect sizes of the eleven educational treatment programs on the specific outcome measures of general achievement, reading achievement, mathematics achievement, and social skills. Reading achievement scores and social skills had effect sizes statistically different from the effect sizes of the other outcome areas. The second hypothesis was accepted.

When the eleven treatment programs were grouped into five general categories, general achievement scores had a significantly different effect size from the other outcome measures. The second hypothesis was again accepted. In addition, percent change analysis revealed a difference in the effect size scores upon specific outcome measures. The second hypothesis was accepted in this analysis.

Hypothesis 3

The third hypothesis stated that program elements and student demographics have a statistically significant effect upon general achievement, reading achievement, mathematics achievement, and social skills scores in interaction with treatment. When the seven demographic and programmatic variables were regressed against the five grouped treatment programs,

significant interactions resulted. There was significant interaction between diagnosis and structured-behavioral treatment upon general achievement scores. Program length and structured-behavioral treatment interacted significantly with both general achievement scores and social skills scores. Structured-behavioral treatment and program facilitator had significant interaction upon general achievement scores, as did grade level and structured-behavioral treatment. There were no statistically significant interactions between IQ, program setting, or SES, and treatment and the outcome measures. The third hypothesis was accepted.

The variables were evaluated separately to determine their effects upon the outcome measures. Each of the program variables, except socio-economic setting, had a statistically significant relationship to an outcome measure.

Limitations

Several cautions and limitations should be considered as the findings of this study are examined: 1. Some studies could have been included or omitted which reflected a bias toward one particular treatment, although efforts were made to include in the population every article meeting selection criteria. 2. A far more serious limitation concerns the subject population. During the ten years that the journal articles were published, no national definition of emotional disturbance existed, nor was

one single label used to define this population. More than one dozen primary labels have been used to describe emotionally disturbed students (Wood and Lakin, 1980). These labels included the terms emotionally disturbed, behaviorally disordered, disruptive, behavior problem, delinquent/offender, aggressive, pre-delinquent, conduct problem, maladapting, noncompliant, behavior disabled, behavior disturbed, moderately disturbed, emotionally handicapped and conduct disordered, as well as terms for identifying symptoms. Based on the large numbers of primary labels, as well as the synonyms encountered, Wood and Lakin have concluded that this population is not well defined, and that the procedures for defining them are inadequate. The success and/or failure of a given intervention may reflect the success or failure of characterization of the subjects rather than the program itself. This factor should be recognized in studying research reports on emotionally disturbed students.

The results of the statistical analyses formed the basis for the conclusions about the relative effectiveness of educational treatment programs, and the role of their variables, for emotionally disturbed students. A discussion of these results and conclusions, as well as implications for future research, is presented in Chapter 5.

Chapter 5

Discussion and Conclusions

The relative effectiveness of educational treatment programs for emotionally disturbed students was investigated in this study. Three specific questions were tested by three hypotheses. The first hypothesis stated that there are significant differences in the total effect size of the various treatment programs for emotionally disturbed students. This hypothesis was rejected.

The second hypothesis stated that there are significant differences in the effect sizes of the treatment programs for emotionally disturbed students in the specific outcome measures of general achievement, reading achievement, mathematics achievement, or social skills. This hypothesis was accepted.

The third hypothesis stated that program elements and student demographics have a statistically significant effect in interaction with treatment upon the general achievement, reading achievement, mathematics achievement, and social skills scores of emotionally disturbed students. This hypothesis was also accepted.

The conclusions based on those findings are presented in Chapter 5. The discussion and conclusions are presented in three sections: (1) Findings, (2) Discussion, and (3) Implications for Future Research.

Findings

The statistical analyses of data produced the following statistically significant findings:

1. There was a significant relationship between the effect size of social skills and structured-behavioral treatment.
2. There was a significant relationship between the effect size of reading achievement and cognitive training treatment.
3. There was a significant relationship between the percent change of social skills and structured-behavioral treatment.
4. There was a significant relationship between the percent change of mathematics achievement and the engineered classroom treatment.
5. There was a significant relationship between the effect size of general achievement and grouped structured-behavioral treatment.
6. There was a significant relationship between the percent change of social skills and grouped structured-behavioral treatment.
7. General achievement was affected by the interaction of diagnosis and structured-behavioral treatment.
8. General achievement was affected by the interaction of

program length and structured-behavioral treatment.

9. Social skills scores were affected by the interaction of program length and structured-behavioral treatment.
10. General achievement was affected by the interaction between the program facilitator and structured-behavioral treatment.
11. General achievement was affected by the interaction of grade level and structured-behavioral treatment.

Regression analysis revealed that the following variables were related to specific outcome measures. For example, the variable of diagnosis was related to both general achievement and reading achievement. Program length was related to general achievement, reading achievement, and social skills.

<u>variable</u>	<u>outcome measure</u>	<u>r²</u>
diagnosis	general achievement	.73
diagnosis	reading achievement	.40
program length	general achievement	.86
program length	reading achievement	.69
program length	social skills	.72
program facilitator	general achievement	.74
program facilitator	social skills	.28
grade level	general achievement	.53
program setting	reading achievement	.38
IQ	all outcome measures	.98

As can be seen, the amount of shared variance ranged from .28 to .98, all significant statistically at the 5 percent level.

The results listed below revealed no statistically significant support for the first hypothesis that there are significant differences in the total effect sizes of the treatment programs.

1. The total effect sizes of the eleven treatment strategies were not statistically different.
2. The mean percent changes of the eleven treatment strategies were not statistically significant.
3. The total effect sizes of the grouped treatment methods were not significantly different.
4. The mean percent changes of the grouped treatment strategies were not significantly different.
5. There was no significant interaction between IQ and treatment.
6. There was no significant interaction between setting and treatment.

Discussion

Significant Findings

Upon examination of the findings which are and are not statistically significant, interesting distinctions emerged. No classroom treatment strategy, used either singly or in a group, yielded a statistically significant total effect size or total

percent change. The interpretation was that there were no differences in the overall effects of any of the tested classroom treatment programs, consistent with the percent change findings. However, when specific outcome areas were investigated, differences appeared. The structured-behavioral treatment program yielded statistically significant effect sizes in the areas of social skills and general achievement; structured-behavioral treatment produced significant percent change in the areas of social skills and of mathematics achievement. There was also a strong relationship between cognitive training and reading achievement.

Another area of difference involved the investigation of the interaction of treatment methods and the demographic/programmatic variables, and the effects of this interaction upon specific outcome areas. Structured-behavioral intervention was the only treatment method to interact with any variable to create a significant change in an outcome area. The specific outcome areas which appeared to be affected by treatment/variable interactions were general achievement and social skills. Reading achievement and mathematics achievement did not seem to be affected by treatment/variable interactions. Demographic and programmatic variables interacting to a significant degree with treatment were diagnosis (hyperactive), length of treatment (2 weeks and 8 weeks), program facilitator (psychologist), and

grade level (K-2). In addition, the other variables, IQ and setting, while not interacting to significance with treatment, were found to be related to the outcome measures. IQ was related to each of the outcome measures, setting (residential) was related to reading achievement.

Conclusions

Analysis of test results produced the following conclusions:

1. Any of the identified treatment programs produced essentially the same overall results. None was superior to another, individually or grouped.
2. For the greatest gain in specific outcome areas, there were educational programs of preference.
3. A cognitive (academic) training program produced significantly greater growth in reading achievement.
4. For social skills improvement, mathematics achievement and general achievement, structured-behavioral treatment was the treatment of choice.
5. For children diagnosed as hyperactive, structured-behavioral treatment was preferred for growth in general achievement.
6. Structured-behavioral treatment had the maximum effect on general achievement at the lower elementary grade

level, kindergarten through second grade, and was most effective when of short duration, two to eight weeks long.

7. Treatment programs were equally effective in a residential setting, day school, resource room or regular classroom.

By combining these statements, it was concluded that a short-term structured-behavioral treatment program in any setting in the lower elementary grades would yield the greatest gains in academic achievement and social skills development. This would be the ideal program for emotionally disturbed students.

Treatment Program Effects

The analyses revealed that there were no significant differences in the total effect sizes of the treatment programs either individually or grouped into broad inclusive categories. This same finding was uncovered when a percent change analysis was run on the treatment programs, individually and grouped. Each group of students, however, which participated as a treatment group showed a significant gain in total effect size, thereby indicating that the treated groups received definite benefits from their treatments over the untreated or control

groups, which received the regular school program. It is important to note that the control or comparison groups were not untreated. During the period of time that the experimental interventions were in force, they continued to receive the regular school program and to gain academically.

Structured-behavioral Treatment

When the effect sizes of the treatment programs were related to specific outcome measures, statistically significant differences appeared. The engineered classroom produced a statistically significant percent change upon mathematics achievement scores. Structured-behavioral treatment program in an academic setting was notable for social growth and change not only when effect size was calculated, but also when percent change was determined.

Structured-behavioral approach predominated in the grouped treatment analyses. When the eleven treatments in this study were grouped into five large categories, those belonging to the structured-behavioral category, including behavior modification and the engineered classroom, were the only interventions having significant effect size and/or percent change results upon any outcome measures. It is known that teachers of the emotionally disturbed use behavior modification techniques more than any other intervention procedure (Benson, 1977). More comparative data were available for this approach, with emotionally disturbed students, than for any alternate method. Of the treatments reported in this study, 45 percent were

behavior modification treatments. With such a large amount of data available compared to that for other interventions, it could have been possible to obtain significant results due to the volume of evidence.

Cognitive Training - Academic

While academic cognitive training has been designated a learning disability strategy (Kirk, 1972), it is listed among several educational strategies suggested for classroom treatment of children with behavior disorders. A similar educational model, formulated by Long and Stevens (1971) was tried in Montgomery County, Maryland (Long, Morse, Newman, 1971). Follow-up studies, not included in this study, indicated that gains made by students in an academic training situation held up over the passage of time, and that the renewed feelings of adequacy and self-worth that the students experienced enabled them to progress academically.

Variable Interactions

In addition to testing the stated theoretical ideas, it was possible to determine the strengths as well as the directions of the variable relationships. The effect size was, in itself, indicative of the relative strength of the treatment programs. In addition, since linear regression analysis was applied in the statistical treatment, a correlation coefficient was computed

for each dependent/independent variable relationship. Squaring that coefficient yielded a measure of the amount of common variance shared by the variables and, by extension, an indication of the strength of the relationships and of the conclusions.

Each of the programmatic and demographic variables was found to be significantly related to at least one outcome measure; the variable of IQ was related to each one of the outcome measures. These findings were similar to those of another researcher, Achenbach (1978), who stated that differences related to sex, race, and socio-economic status are as likely to affect behavior as are the experiential differences related to IQ level. The sources or settings in which the students are educated also, according to Achenbach, exert major influences on behavior.

Diagnosis. Structured-behavioral classroom techniques alone interacted consistently with demographic and programmatic variables. Analysis of the results showed that children diagnosed as hyperactive responded best to structured-behavioral treatment in general achievement. The amount of common variance was 73 percent, indicating a strong relationship. However, it is important to remember that the term "hyperactive" may differ in meaning to each person who applies it to an emotionally disturbed child. The lack of clear descriptions of subject populations and replicable defining procedures severely limit the usefulness of much research being done at present (Wood and Lakin, 1980).

It may be that the label a child wears is less important than the method used to assist that child to learn. The interaction of any specific label, therefore, with any specific teaching method should be viewed with caution.

Program length. Additional regression analyses showed that a short, two to eight week program of structured behavioral classroom treatment produced statistically significant outcome measures in both general achievement (common variance was 86 percent) and social skills scores (common variance was 72 percent). According to the data base for this study, the average length of time spent in treatment was 24.2 months. It is hard to reconcile this long mean stay within a specific treatment modality with the apparent superiority of a short program, unless the structured-behavioral intervention is extremely efficient and effective when carried out in an intense, concentrated fashion. This may have reflected the results of an intense program with only one specified goal. It should also be considered that over a period of time the purity of any treatment model may diminish, and what was seen as a statistical difference between lengths of treatments may have been a difference between types of treatment programs.

Grade level. The structured-behavioral treatment program interacted with grade level variable, kindergarten through second grade, to produce the maximum effect size on general

achievement for any intervention. The variance in common was 53 percent. This may reflect the tendency for school boards to establish smaller classes in the lower elementary grades, adding pupils as the grade level increases, or the fact that the younger the pupil is, the more amenable he is to any sort of treatment. It may also reflect the fact that with early educational intervention the child has lost less ground academically, and can therefore recover his class standing more readily than an older student who is liable to be anywhere from one to four years behind the average pupil in academic expectancy (Kirk, 1972). This provides an interesting counter point to the meta-analysis of research on class size and achievement (Glass and Smith, 1979), where the researchers concluded that the class size and achievement relationship seemed consistently stronger in the secondary grades than in the elementary level. It may also be important to note that a child who has been unable to learn basic subjects in the primary grades will probably experience an ever increasing disability as the gap widens, and those competencies lacking but presumed to have been established are exposed (Long, Morse, Newman, 1971).

Setting. The final interaction of interest concerned location, or site of the treatment program. Regression analysis of location and outcome measures computed no significant differences in effectiveness, regardless of setting. It is interesting that in 1966 some researchers reached the conclusion

that special classes did not produce results significantly different from regular classes (Rubin, Simson, and Betwee, 1966). Further verification appeared in a meta-analysis on the effects of special classes, resource rooms, and other treatments for exceptional children which showed no significant differences among many types of outcome measures (Carlberg, 1979).

Implications for Future Research

This study confirmed that meta-analysis was a viable technique for combining the results of many studies. It revealed both the strength and relative importance of relationships between variables through an easily understood measure; effect size, a standard score. Meta-analysis can be used as a powerful tool by future researchers to determine the relative effectiveness of educational programs and the role of their demographic and programmatic variables.

This study examined the effectiveness of educational treatment programs for emotionally disturbed students. Many questions remain unanswered. For example, no one classroom treatment method yielded a statistically significant total effect size or total percent change, yet structured-behavioral treatment produced a statistically significant effect size or percent change in the outcome areas of social skills, mathematics achievement, and general achievement. In reading achievement, cognitive training produced a statistically significant effect size. Further research may determine if reading achievement is

affected differently from the other outcome areas.

Structured-behavioral treatment was the only treatment which interacted to a significant degree with any variable, interacting with diagnosis, length of treatment, program facilitator, and grade level. These variables were also found directly related to the outcome areas of general achievement and social skills. Setting and IQ were found to be related to all of the outcome areas, yet no significant interaction with treatment was reported for them. The relationship of the demographic and programmatic variables to specific interventions needs more investigation. In addition, for the variable of diagnosis, a clear, uniform definition of the term "emotionally disturbed/behavior disordered" is needed so that the special population can be readily identifiable.

The discrepancy in the lengths of time of treatment should be investigated to determine what is occurring when the average time in a treatment program is slightly over two years, but the greatest gain occurs in two to eight weeks. Research can reveal if the treatment program has deteriorated over the long time to become such a different model that the initial gains are the true measures of growth. Clarification should be made of the role of the program facilitator to determine if the person who designs, charts, and implements an intervention model is more likely to have a successful program than one who carries out another's plan.

Finally, the variable of program setting or "milieu" should be examined. Program setting has been described by researchers as an important variable in education, and found to be related to outcome measures, yet in this meta-analysis there was no significant interaction of program setting with treatment. Investigation of this inconsistency is of great importance. With the emphasis on least restrictive environment for handicapped students, and the current budget battles over financial support for education, placement of the emotionally disturbed student in the least restrictive environment, where the per student cost is lowest, and the potential for student growth is the highest, is a priority.

APPENDIX

APPENDIX A

Journals Used in Study by Publication Category

Special Education	Psychology	Behavioral
American Journal of Orthopsychiatry	Child Development	Behavior Modification
Exceptional Children	Journal of Autism and Childhood Schizophrenia	Behavior Research and Therapy
Journal of Learning Disabilities	Journal of Abnormal Child Psychology	Behavior Therapy
Journal of School Psychology	Journal of Consulting and Clinical Psychology	Journal of Applied Behavior Analysis
Journal of Special Education	Journal of Educational Psychology	
Psychology in the Schools	Journal of Clinical Psychology	
Number of Studies per Category		
105	71	44

Note. Total studies = 220.

APPENDIX B

Articles Used in Study

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APPENDIX C

Coding Characteristics

Identification

- (1) type of journal; special education, psychological, behavioral
- (2) specific article

Treatment program characteristics

- (3) length of time (weeks) of treatment
- (4) number of students
- (5) program facilitator; the person who actually carried out the treatment program
 - (5-1) teacher
 - (5-2) psychologist
 - (5-3) consultant
 - (5-4) volunteer
 - (5-5) paraprofessional
 - (5-6) physician
 - (5-7) other
- (6) program setting, from most to least restrictive
 - (6-1) residential - twenty-four hour protected environment
 - (6-2) day-care - special school or building
 - (6-3) self-contained - special class in regular school
 - (6-4) resource - part-time special class, in regular school

- (6-5) regular class - with or without an itinerant
special education teacher or consultant

Type of Treatment Program

- (7-1) psychoeducational - a treatment program focused on the child's behavior and his interpersonal relationships as well as his entire educational experience, characterized by an educational team composed of a special education teacher, psychologist, psychiatric consultant, social worker and other specialists.
- (7-2) structured-behavioral (social) - a treatment program based on the identification of mal-adaptive behaviors which interfere with learning, and subsequent assistance to the student in developing more adaptive behavior. Following established principles of behavior modification, emphasis is placed on elimination of such behavior as fighting, blurting-out, and an assessment is made of progress.
- (7-3) structured-behavioral (academic) - a treatment program much like the above where assessment is made of progress in academic areas such as spelling, reading, and mathematics.
- (7-4) sensori-neurological - a treatment program often used with students whose learning problems are

believed to stem from perceptual-motor deficits, general coordination deficits, hyperactivity, impulsivity, short attention span or distractability. Such a program features reduced space and reduced environmental stimuli, a structured school program and a multi-sensory approach to learning tasks.

- (7-5) psychopharmaceutical - a program of drug therapy to influence behavior, prescribed by a physician.
- (7-6) engineered - a strategy developed by Hewett (1968) for educating emotionally disturbed students. It features a developmental sequence of educational goals in a structured behavioral framework, with assessment done in social and academic areas.
- (7-7) academic - a classroom approach featuring an extension of traditional educational procedures where reading method A, for example, is compared with method B.
- (7-8) counseling (family, teachers) - the provision of counseling services by a psychologist or a psychiatrist on a regularly scheduled basis to those individuals most frequently in contact with the disturbed child.
- (7-9) counseling (group) - a treatment featuring regularly scheduled meetings of a class or part

of a class with a therapist, either during the school day or as part of a school program.

(7-10) counseling (individual) - a program of intensive therapy sessions on a one to one basis between the student and therapist, who may or may not have input into the school program.

(7-11) cognitive training - a treatment often used with impulsive students. Training is done in areas of decision-making, problem solving, reflection, self-direction and self-control. Results are measured in reading, mathematics, and spelling scores.

(7-12) cognitive training - behavioral - a method often used with anxious, impulsive, phobic students. The training is done in the area of relaxation, often with tapes and visual aids.

Student Demographics

- (8) pupil ability (average IQ of group)
- (9) average age of group in months
- (10) sex
- (11) socio-economic status (SES) of group
- (12) medication

Diagnosis

- (13-1) emotionally disturbed
- (13-2) behavior disordered

- (13-3) autistic/schizophrenic
- (13-4) delinquent
- (13-5) learning disordered (educationally handicapped)
- (13-6) hyperactive
- (13-7) impulsive

Grade Level

- (14-1) lower elementary
- (14-2) upper elementary
- (14-3) middle school
- (14-4) high school
- (14-5) ungraded

Outcome Variables

- (15) effect size
 - (15-1) general achievement
 - (15-2) reading achievement
 - (15-3) mathematics achievement
 - (15-4) social skills/classroom behavior
- (16) percent change
 - (16-1) general achievement
 - (16-2) reading achievement
 - (16-3) mathematics achievement
 - (16-4) social skills/classroom behavior

APPENDIX D

Bibliographies

Council for Exceptional Children:

- (1) Emotionally disturbed - programs November 1973
Exceptional Child Bibliography Series, N. 619
- (2) Emotionally disturbed - research November 1973
Exceptional Child Bibliography Series N. 618
- (3) Emotionally disturbed, counseling and therapy
Exceptional Child Bibliography Series N. 629
- (4) Emotionally disturbed, teaching methods and programs
Exceptional Child Education Resources No. 704
- (5) Emotionally disturbed, teaching methods and programs
Exceptional Child Education Resources No. 804
- (6) Autism, a selective bibliography
Exceptional Child Bibliography Series No. 603
- (7) Hyperactivity, a selective bibliography
Exceptional Child Bibliography Series No. 643

Lakin, C. Private Correspondence, "Defining emotionally disturbed"

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Abstract

A META-ANALYSIS OF THE EFFECTIVENESS OF EDUCATIONAL TREATMENT PROGRAMS FOR EMOTIONALLY DISTURBED STUDENTS

Claire M. Rosenbaum, Ed.D.

The College of William and Mary in Virginia, 1983

Chairman: G. William Bullock, Jr., Ed.D.

The purpose of this study was to identify and compare the effects of educational treatment programs for emotionally disturbed students. In addition, the study explored whether programmatic or demographic variables interacted with the treatment programs to affect the outcome measures.

Two hundred twenty studies were integrated using the meta-analysis technique. The analysis involved more than 2,300 research subjects and yielded 235 measures of effect size, which were calculated on outcome areas of general achievement, mathematics achievement, reading achievement, and social skills. Variables investigated were age, diagnosis, SES, IQ, length of program, program setting, and program facilitator.

It was hypothesized that (1) there are significant differences in the overall effects of educational treatment programs for emotionally disturbed students, (2) there are differences in the effects of these treatment programs upon the specific outcome measures of mathematics achievement, reading achievement, general achievement, and social skills, (3) program elements and student demographics interact with the treatment programs to significantly affect the outcomes.

Data analysis involved: (a) descriptive statistics for the data base, (b) analysis of variance to test the effectiveness of the treatment programs, and (c) regression analysis where the effect sizes were regressed onto the variables.

No statistically significant differences in the total effect sizes of the eleven treatment programs were found. There were statistically significant differences among the treatment programs upon specific outcome measures. Programmatic and demographic variables were found to significantly affect outcome areas when interacting with structured-behavioral treatment.

It was concluded that no one treatment program was superior to another in overall effects. However, a short term structured behavioral treatment program in the lower elementary grades would yield the greatest gains in both academic and social skills achievement. Further study is needed to evaluate the variable relationships.